

PATENT COOPERATIVE TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room
 CP2/5C24
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE
 in its capacity as elected Office

Date of mailing (day/month/year) 13 March 2001 (13.03.01)	
International application No. PCT/FI00/00501	Applicant's or agent's file reference PPC11155/UH
International filing date (day/month/year) 06 June 2000 (06.06.00)	Priority date (day/month/year) 24 June 1999 (24.06.99)
Applicant MÄKINEN, Risto et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

16 January 2001 (16.01.01)

☐ in a notice effecting later election filed with the International Bureau on:
2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO
 34, chemin des Colombettes
 1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

Claudio Borton

Telephone No.: (41-22) 338.83.38

RECORD COPY

PCT REQUEST

1/4

PPC11155/UH

Original (for SUBMISSION) - printed on 05.06.2000 10:40:55 AM

0	For receiving Office use only	
0-1	International Application No.	PCT/FI 0 0 / 0 0 5 0 1
0-2	International Filing Date	0 6 JUN 2000 (0 6 -06- 2000)
0-3	Name of receiving Office and "PCT International Application"	The Finnish Patent Office PCT International Application
0-4	Form - PCT/RO/101 PCT Request	
0-4-1	Prepared using	PCT-EASY Version 2.90 (updated 10.05.2000)
0-5	Petition The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty	
0-6	Receiving Office (specified by the applicant)	National Board of Patents and Registration (Finland) (RO/FI)
0-7	Applicant's or agent's file reference	PPC11155/UH
I	Title of invention	A METHOD AND A DEVICE IN CONNECTION WITH A REEL-UP
II	Applicant	
II-1	This person is:	applicant only
II-2	Applicant for	all designated States except US
II-4	Name	VALMET CORPORATION
II-5	Address:	Fabianinkatu 9 A FIN-00130 HELSINKI Finland
II-6	State of nationality	FI
II-7	State of residence	FI
III-1	Applicant and/or inventor	
III-1-1	This person is:	applicant and inventor
III-1-2	Applicant for	US only
III-1-4	Name (LAST, First)	MÄKINEN, Risto
III-1-5	Address:	Sointulantie 2 FIN-04600 MÄNTSÄLÄ Finland
III-1-6	State of nationality	FI
III-1-7	State of residence	FI

PCT REQUEST

PPC11155/UH

Original (for SUBMISSION) - printed on 05.06.2000 10:40:55 AM

III-2	Applicant and/or inventor	
III-2-1	This person is:	applicant and inventor
III-2-2	Applicant for	US only
III-2-4	Name (LAST, First)	ENWALD, Petri
III-2-5	Address:	Karkiantie 1 E FIN-04310 TUUSULA Finland
III-2-6	State of nationality	FI
III-2-7	State of residence	FI
III-3	Applicant and/or inventor	
III-3-1	This person is:	applicant and inventor
III-3-2	Applicant for	US only
III-3-4	Name (LAST, First)	VERÄJÄNKORVA, Janne
III-3-5	Address:	Nuumäentie 7 A 3 FIN-02710 ESPOO Finland
III-3-6	State of nationality	FI
III-3-7	State of residence	FI
IV-1	Agent or common representative; or address for correspondence	
	The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:	agent
IV-1-1	Name	TAMPEREEN PATENTTITOIMISTO OY
IV-1-2	Address:	Hermiankatu 6 FIN-33720 TAMPERE Finland
IV-1-3	Telephone No.	+358-3-288 6111
IV-1-4	Facsimile No.	+358-3-288 6262
IV-1-5	e-mail	tampat@patentti.elisa.fi
V	Designation of States	
V-1	Regional Patent (other kinds of protection or treatment, if any, are specified between parentheses after the designation(s) concerned)	AP: GH GM KE LS MW MZ SD SL SZ TZ UG ZW and any other State which is a Contracting State of the Harare Protocol and of the PCT EA: AM AZ BY KG KZ MD RU TJ TM and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT EP: AT BE CH&LI CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE and any other State which is a Contracting State of the European Patent Convention and of the PCT OA: BF BJ CF CG CI CM GA GN GW ML MR NE SN TD TG and any other State which is a member State of OAPI and a Contracting State of the PCT

PCT REQUEST

PPC11155/UH

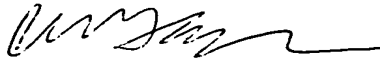
Original (for SUBMISSION) - printed on 05.06.2000 10:40:55 AM

V-2	National Patent (other kinds of protection or treatment, if any, are specified between parentheses after the designation(s) concerned)	AE AG AL AM AT (patent and utility model) AU AZ BA BB BG BR BY CA CH&LI CN CR CU CZ (patent and utility model) DE (patent and utility model) DK (patent and utility model) DM DZ EE (patent and utility model) ES FI (patent and utility model) GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK (patent and utility model) SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW	
V-5	Precautionary Designation Statement In addition to the designations made under items V-1, V-2 and V-3, the applicant also makes under Rule 4.9(b) all designations which would be permitted under the PCT except any designation(s) of the State(s) indicated under item V-6 below. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit.		
V-6	Exclusion(s) from precautionary designations	NONE	
VI-1	Priority claim of earlier national application		
VI-1-1	Filing date	24 June 1999 (24.06.1999)	
VI-1-2	Number	991450	
VI-1-3	Country	FI	
VI-2	Priority document request The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) identified above as item(s):	VI-1	
VII-1	International Searching Authority Chosen	Swedish Patent Office (ISA/SE)	
VIII	Check list	number of sheets	electronic file(s) attached
VIII-1	Request	4	-
VIII-2	Description	8	-
VIII-3	Claims	3	-
VIII-4	Abstract	1	ppc11155.txt
VIII-5	Drawings	2	-
VIII-7	TOTAL	18	

PCT REQUEST

PPC11155/UH

Original (for SUBMISSION) - printed on 05.06.2000 10:40:55 AM

	Accompanying items	paper document(s) attached	electronic file(s) attached
VIII-8	Fee calculation sheet	✓	-
VIII-9	Separate signed power of attorney	✓	-
VIII-10	Copy of general power of attorney	✓	-
VIII-16	PCT-EASY diskette	-	diskette
VIII-17	Other (specified):	copy of Office Action	-
VIII-18	Figure of the drawings which should accompany the abstract	3	
VIII-19	Language of filing of the international application	Finnish	
IX-1	Signature of applicant or agent		
IX-1-1	Name	TAMPEREEN PATENTTITOIMISTO OY	
IX-1-2	Name of signatory	Unto Hakola	

FOR RECEIVING OFFICE USE ONLY

10-1	Date of actual receipt of the purported international application	06 JUN 2000	(06 -06- 2000)
10-2	Drawings:		
10-2-1	Received		
10-2-2	Not received		
10-3	Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application		
10-4	Date of timely receipt of the required corrections under PCT Article 11(2)		
10-5	International Searching Authority	ISA/ SE	
10-6	Transmittal of search copy delayed until search fee is paid		

FOR INTERNATIONAL BUREAU USE ONLY

11-1	Date of receipt of the record copy by the International Bureau	23 JUNE 2000	(23. 06. 00)
------	--	--------------	----------------

1/2

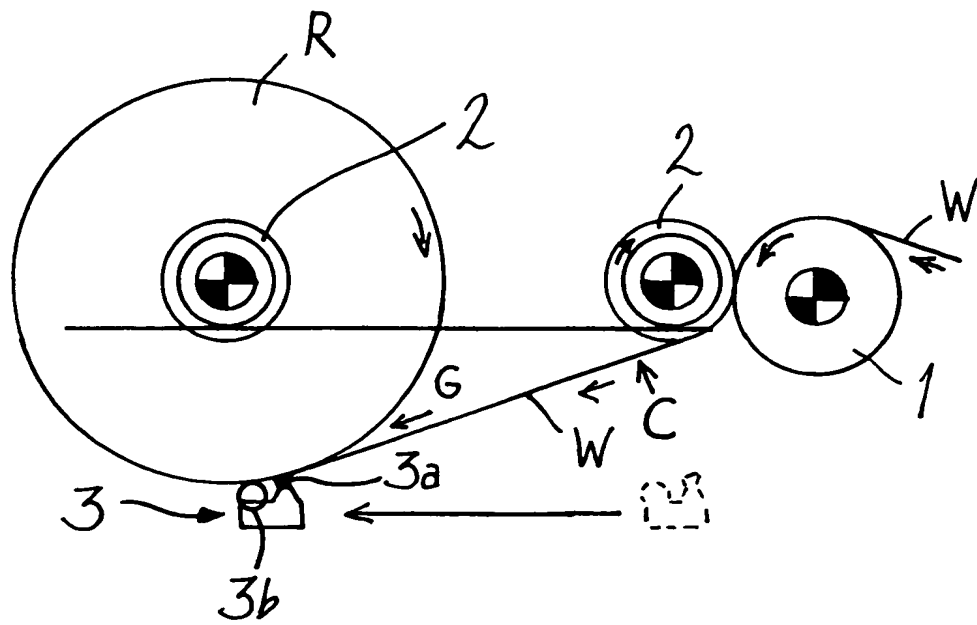


Fig. 1

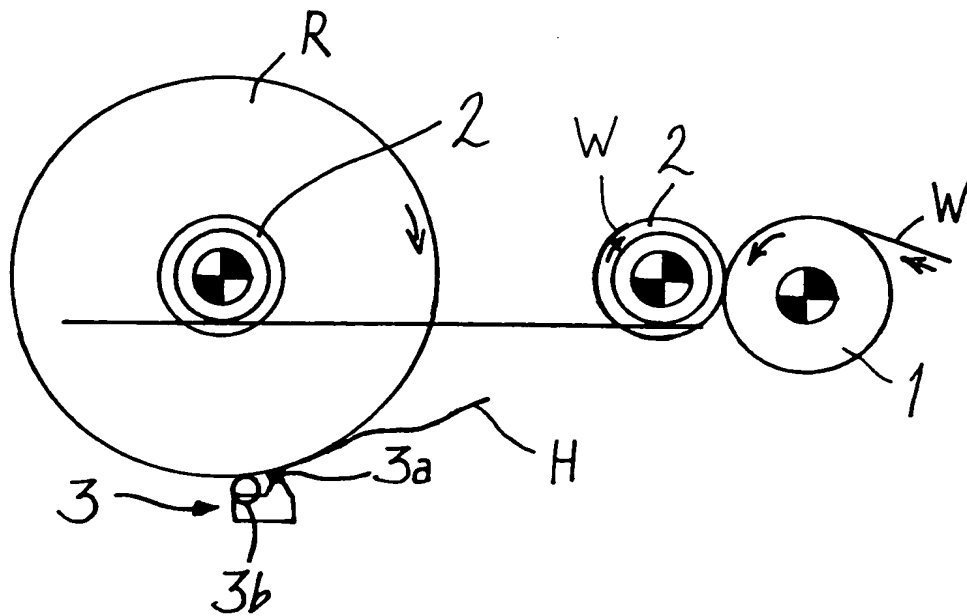


Fig. 2

2/2

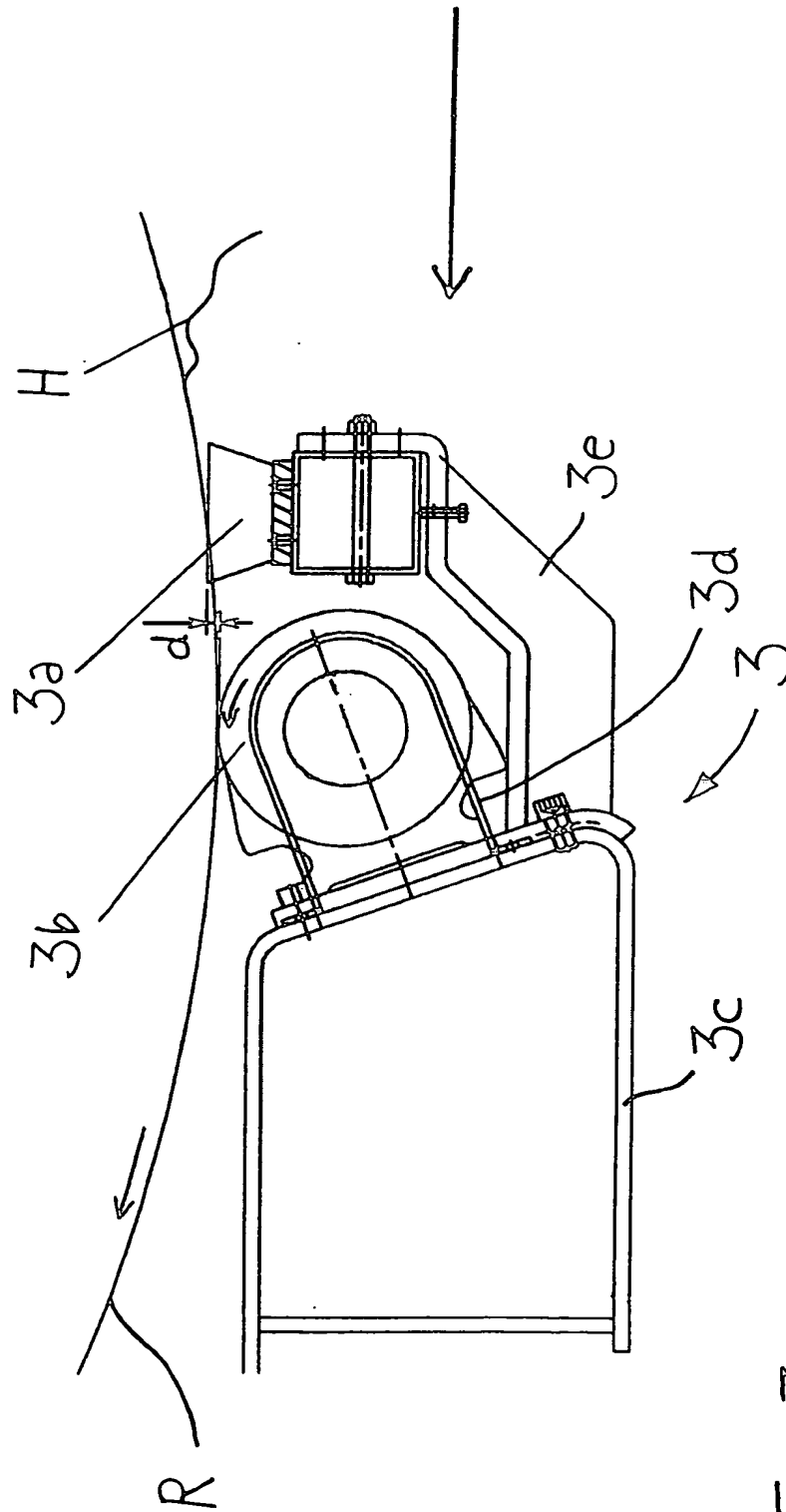


Fig. 3

Menetelmä ja laite rullaimen yhteydessä

Keksintö kohdistuu oheisen patenttivaatimuksen 1 johdanto-osan mukaiseen menetelmään rullaimen yhteydessä. Keksintö kohdistuu myös
5 laitteeseen rullaimen yhteydessä, joka laite on oheisen patenttivaatimuksen 8 johdanto-osassa esitettyä tyyppiä.

Jatkuvatoimisella kiinnirullaimella rullataan paperikoneesta tai paperin
10 jälkikäsittelykoneesta tulevaa jatkuvaa, tavallisesti useita metrejä leveää paperirainaa konerulliksi. Rullauksen toteuttamiseksi jatkuvatoimisesti on väliajoin suoritettava rullan vaihto, jossa edellisen konerullan tullessa täyteen rainan kulku ohjataan uudelle, seuraavan konerullan ytimen muodostavalle tampuuritelalle.

15 Rullausasemassa rullattavan rainan tullessa täyteen katkaistaan raina jollain sopivalla, esimerkiksi rainan pintapainosta riippuvalla menetelmällä, ja katkaisukohtaa seuraava rainan uusi pää ohjataan uuden tyhjän tampuuritelan ympärille, joka on aikaisemmin tuotu vaihtoasemaan tampuurivarastosta. Tätä vaihtosekvenssiä tai jotakin sen osaa koskevia patentteja ja patenttihakemuksia on monia. Hakijan suomalaisessa
20 patentissa 95683, jota vastaa kansainvälinen julkaisu WO 93/34495 ja US-patentti 5,779,183, on esitetty painolaite, jolla estetään ilman pääsy rullaan tulevan rainan alle. Hakijan suomalaisessa patenttihakemuksessa 915432, jota vastaa US-patentti 5,360,179, on puolestaan esitetty eri tapoja katkaista raina rullanvaihdon yhteydessä. Hakijan suomalaisessa patentissa 97339, jota vastaa EP-hakemusjulkaisu 739695 ja
25 US-patentti 5,765,462, on esitetty rainan katkaiseva teräkatkaisulaite. Hakijan suomalaisessa patentissa 100590 on vielä esitetty tapa katkaista raina täysleveästi iskevällä katkaisuterällä ja puhaltaa rainan uusi
30 pää ilmapuhalluksella tyhjälle tampuuritelalle.

On tunnettua siirtää em. painolaite, jossa kontaktielimenä on harja tai tela, kuormituskontaktiin rullan pinnan, oleellisesti rullan alapinnan kanssa rullauksen loppuvaiheessa, ja painolaitetta kuljetetaan kuormituskontaktissa täyden rullan kanssa siirrettäessä rullaa vaihtoasemaan.
35 Tunnetuilla painolaitteilla on onnistuttu estämään ilman pääsyä rullaan ja sen seurauksena valmistuvan konerullan pintakerrosten löystymistä.

Ongelmana on kuitenkin, varsinkin ajonopeuksien kasvaessa yli 25 m/s nopeuksiin, konerullaan päällimmäiseksi katkaisun jälkeen jäävän "hännän" käyttäytyminen.

5

Kun painolaitteessa käytetään kontaktielimenä harjamaista elintä, jonka harjakset ovat kosketuksissa konerullan pintaan, ongelmana on riittämätön viivakuorma kosketuskohdassa. Harjan ja paperin kosketuksesta aiheutuu pölyämistä. Lisäksi harjan aiheuttama laahausvoima aiheuttaa muutoksen ratakiireyteen rullan vaihtoa tehtäessä.

10

Painotela kontaktielimenä pitää rullan hyvin kasassa eikä se aiheuta pölyämistä. Kohdatessaan painolaitteen on häntä irti rullan pinnasta ja iskeytyy painolaitteeseen aiheuttaen voimakkaan nykäisyn paperiin, jolloin paperipaloja repeytyy irti. Painotela puristaa nämä irralliset palat paperirullan pintaan, ja nämä palat kulkeutuvat rullan pyörimisliikkeen mukana rullan yläsektoriin, josta ne saattavat leijua uuden aloitetun rullan ja rullaussylinterin väliseen nippiin, päätyvät näin uuden rullan sisään ja aiheuttavat hylkyä ja prosessin seuraavassa vaiheessa ongelmia, erityisesti superkalanterilla tai vastaavalla moninippi-kalanterilla.

15

20

Tämän keksinnön tarkoituksena on esittää menetelmä rullaimen yhteydessä, jolla edellä esitetyt, tunnettuihin ratkaisuihin sisältyvät puutteet voidaan mitä suurimmassa määrin poistaa ja siten kohottaa alalla vallitsevan tekniikan tasoa. Tämän tarkoituksen toteuttamiseksi keksinnön mukaiselle menetelmälle on pääasiassa tunnusomaista se, mikä on esitetty oheisen patenttivaatimuksen 1 tunnusmerkkiosassa. Keksinnön mukaiselle laitteelle on puolestaan tunnusomaista se, mikä on esitetty oheisen patenttivaatimuksen 8 tunnusmerkkiosassa.

25

30

Menetelmälle on ominaista rullan ja/tai rullasta irti olevan tai siitä irtaantumaa pyrkivän hännän hallinta kahdessa eri kohdassa rullan kehällä: rullan uloimpien pintakerrosten hallinta kuormituksen aiheuttavalla painotelalla ja hännän hallinta erillisen ohjauselimen avulla, jolla on pienempi kuormitus rullaa vasten ja jonka pintanopeus eroaa oleellisesti rullan kehäpinnan pintanopeudesta. Jälkimmäisellä elimellä hallitaan pääasiassa häntää ohjaamalla sitä kohti rullaa ja/tai pyyhkimällä hän-

35

3

nästä irtaantuneet palat pois ennen niiden kulkeutumista rullan ylemmälle puoliskolle, josta ne voisivat edelleen joutua sulkeutuvaan rullaussylinteriin. Laitteelle on ominaista rullan painotelan ja hännän ohjauselimien yhdistelmä.

5

Muut keksinnölle tunnusomaiset piirteet käyvät ilmi oheisista epäitsestä patenttivaatimuksista ja jäljempänä tulevasta selityksestä.

10

Keksintöä kuvataan lähemmin seuraavassa selityksessä viitaten oheiseen piirustukseen, jossa

kuva 1 esittää sivukuvantona tilannetta paperirainan rullaimessa ennen rainan katkaisua,

15

kuva 2 esittää sivukuvantona tilannetta paperirainan rullaimessa rainan katkaisun jälkeen, ja

kuva 3 havainnollistaa laitetta suuremmassa mittakaavassa.

20

Kuvassa 1 on esitetty sinänsä tunnettu paperirainan rullain, jossa menetelmää ja laitetta käytetään. Kyseessä on jatkuvatoiminen kiinnirullain, joka rullaa paperikoneelta tai paperin jälkikäsittelykoneelta tulevasta jatkuvasta paperirainasta W peräkkäisiä konerullia R tampuuritelojen 2 ympärille. Tampuuriteloja 2 kannatetaan rullauksen aikana päädyistä sopivalla tukirakenteella, kuten rullauskiskoilla. Rullauksen aikana konerullia pyöritetään omalla keskiökäytöllä. Kuvassa 1 on esitetty tilanne, jossa rullan vaihdon toteuttamiseksi täyteen tullut konerulla R on viety tampuuritelan 2 päätyihin yhteydessä olevilla rullausvaunuilla irti rullaussylinteristä 1, jonka kautta paperiraina W on tullut rullan ja sylinterin 1 välisen rullaussylinterin kautta rullalle. Tulevan rainajuoksun ja rullan ulkopinnan välistä kapenevaa kitaa, josta ilma pyrkii tunkeutumaan rullaan, on merkitty nuolella G. Kuvasta 1 näkyy vielä, kuinka uusi tampuuritela 2 on tuotu kontaktiin rullaussylinterin 1 pinnalla kulkevan rainan W kanssa vaihdon suorittamiseksi.

35

Kuvassa 1 on esitetty myös painolaite 3, jolla kuvan 1 tilanteessa estetään ilman pääseminen kidan G kautta rainan alle rullaan. Tilanteessa,

jossa rulla R on täyttymässä mutta vielä rullausnipin kautta kontaktissa rullaussylinteriin, painolaite 3 on tuotu kuormituskontaktiin rullan R pinnan kanssa ja se on siirretty yhdessä rullan kanssa eteenpäin kuvan 1 vaihtoasemaan irti rullaussylinteristä 1. Ratkaisuja painolaitteen 3 siirtämiseksi kiinni rullaan ja siirtämiseksi eteenpäin yhdessä rullan kanssa ei ole kuvattu tarkemmin. Tämän jälkeen raina katkaistaan nuolella C merkitystä kohdasta esim. kokoleveällä teräkatkaisulaitteella tai vaihtopuhalluksella, minkä jälkeen rainan uusi pää ohjataan uuden tampuuri-telan 2 ympärille.

Kuvassa 2 on esitetty tilanne katkaisun jälkeen. Rullaan menevään rainaan viimeiseksi jäävä rainan vapaa loppupää muodostaa hännän H, joka pyrkii irtautumaan rullasta R. Katkaisun jälkeen aletaan rullan R pyörimisnopeutta myös hidastaa esim. rullan ytimen muodostavan tampuuri-telan keskiökäytön avulla. Painolaite 3 käsittää rullan R pyörimissuunnassa ensimmäisenä ohjauselimen 3a, jonka tarkoituksena on pääasiallisesti ohjata katkaistun rainan W häntä lähemmäksi rullan kehäpintaa tai vasten rullan kehäpintaa, ja tietyllä voimalla rullan pintaa vasten kuormitettavan, oleellisesti samalla pintaanopeudella kuin rulla pyörivän elimen, joka muodostaa nipin rullan kehäpinnan kanssa. Tällainen elin voi muodostua vapaasti pyöriväksi laakeroidusta painotelasta 3b. Ohjauselin 3a ei ole välttämättä kontaktissa rullan pintakerrokseen ja mikäli se on kontaktissa, se on vasten rullan kehäpintaa joka tapauksessa pienemmällä voimalla kuin ohjauselimen 3a jälkeen tuleva painotela 3b, joka estää kuvan 1 tilanteessa ilman pääsyn kidasta G rullaan ja jolla sidotaan kuvan 2 tilanteessa rullan pintakerroksia niiden pitämiseksi kasassa erityisesti hidastettaessa rullan pyörimisnopeutta.

Ohjauselin 3a sijaitsee rullan alemman puoliskon alueella ja sillä hallitaan katkaistussa rainassa W viimeisenä olevan hännän H kulkua. Ohjauselin 3a sijaitsee edullisimmin rullan alimman kohdan läheisyydessä, esimerkiksi sektorissa $\pm 45^\circ$ siitä. Painotela 3b on pyörimissuunnassa lyhyen etäisyyden päässä ohjauselimen 3a jälkeen. Etäisyys on sellainen, että häntä ei ehdi irtoamaan oleellisesti rullan pinnasta. Etäisyys rullan kehää pitkin mitaten on edullisesti suunnilleen alle 1/4 rullan halkaisijasta, eli asteina ilmaistuna n. alle 30° .

Vapaa häntä H kiertää rullan R kehällä rullan pyörimisliikkeen mukaisesti rullan pyörimisakselia usean kierroksen ajan, ja ohjauselimellä 3a hallitaan hännän H käyttäytymistä edullisesti usean kierroksen ajan rannan katkaisun jälkeen.

5

Kuvassa 3 on esitetty painolaite 3 yksityiskohtaisempana kuvantona. Ohjauselin 3a on kiinnitetty samaan konesuunnassa esim. johteiden ohjaamana liikuteltavaan runkoon 3c kuin pyöriväksi järjestetty painotela 3b. Kuten kuvasta näkyy, ohjauselin on harjaksista muodostuva harja, joka on kontaktissa rullan R kehäpinnan kanssa ja pyyhkii näin rullan pintaa rullan pyöriessä. Painotelalla 3b saadaan aikaan pintakerrosten sitomiseksi tarvittava kuormitus. Jos ennen painotelaa 3b ei olisi ohjauselinä 3a, paperirainan häntä H tekisi ruoskan sivallusta muistuttavan liikkeen telan 3b pintaan ja murtuisi palasiksi, jotka tela painaisi rullan pintaan. Nyt kuvan 3 esittämässä tilanteessa ohjauselin 3a estää hännästä mahdollisesti irtoavien paperipalasten kulkeutumisen telan ja rullan välistä. Hännästä mahdollisesti irtoavat palat jäävät ohjauseli-

10 harja, joka on kontaktissa rullan R kehäpinnan kanssa ja pyyhkii näin rullan pintaa rullan pyöriessä. Painotelalla 3b saadaan aikaan pintakerrosten sitomiseksi tarvittava kuormitus. Jos ennen painotelaa 3b ei olisi ohjauselinä 3a, paperirainan häntä H tekisi ruoskan sivallusta muistuttavan liikkeen telan 3b pintaan ja murtuisi palasiksi, jotka tela painaisi rullan pintaan. Nyt kuvan 3 esittämässä tilanteessa ohjauselin 3a estää hännästä mahdollisesti irtoavien paperipalasten kulkeutumisen telan ja rullan välistä. Hännästä mahdollisesti irtoavat palat jäävät ohjauseli-

15 meen 3a ja tippuvat siitä alas, jolloin ne voidaan helposti ohjata esimerkiksi pulpperiin, joka on rullaimen alapuolella.

20

Ohjauselimen 3a rullaa vastapäätä olevan pinnan ja rullan kehäpinnan samansuuntaiset pintaanopeudet ovat oleellisesti toisistaan eroavat. Rainan kehäpinnan ja ohjauselimen sitä vastapäätä olevan pinnan välillä on siis suhteellinen nopeusero. Nopeusero on sellainen, että ohjauselimen 3a pinnan nopeus rullan kehäpinnan liikesuuntaan on selvästi pienempi kuin rullan kehäpinnan pintaanopeus. Nopeusero on mahdollista saada aikaan järjestämällä ohjauselin 3a staattiseksi eli paikallaan pysyväksi, kuten kuvassa 3 esitetty harja, jolloin ohjausselimen 3a pinnan nopeus rullan kehäpinnan suhteen rullan kehäpinnan liikesuuntaan on $-v_1$, jossa v_1 on rullan kehäpinnan pintaanopeus. Toi-

25 nen mahdollisuus saada aikaan nopeusero on järjestää ohjauselin 3a pyöriväksi siten, että se pyörii samaan pyörimissuuntaan kuin rulla R, jolloin lähimpänä rullan kehäpintaa oleva ohjauselimen 3a pinta liikkuu vastakkaiseen suuntaan kuin rullan R kehäpinta. Jos ohjauselimen pintaanopeus on v_2 , on ohjauselimen 3a suhteellinen pintaanopeus rullan R kehäpinnan suhteen $-(v_1 + v_2)$. Jos ohjauselimen 3a pinta on järjestetty liikkuvaksi rullaa lähimpänä olevassa kohdassa samaan suuntaan

30

35

6

kuin rullan kehäpinta sitä pienemmällä pintaanopeudella v_2 , ohjauseli-
men 3a suhteellinen pintaanopeus rullan R kehäpinnan suhteen on täl-
löin $-v_1 + v_2$. Kaikki em. tapaukset aiheuttavat sen, että ohjauseli-
men 3a pinta "laahaa" vasten rullan R kehäpintaa ja/tai rainan häntää H.

5

Rullan R kehäpintaa vastapäätä oleva ohjauseli-
men 3a pinta on muo-
dostettu joustavaksi siten, että sitä voidaan painaa tietty matka rullan
pintaa vasten ja se voi myös mukautua rullan halkaisijan vaihteluihin.
Tällöin ohjauseli-
men 3a asemaa rullan R suhteen ei tarvitse säätää tar-
kasti. Myöten antavan pinnan toteuttamiseksi ohjauselimessä 3a voi
olla harjaksia, mutta myös muun tyyppisiä taipuisia elimiä, jotka pyyhki-
vät rullan R pintakerroksia ja/tai häntää H. Ohjauselimessä 3a voi olla
esimerkiksi koneen poikkisuunnassa eli rullan akselin suunnassa kul-
kevia taipuisia liuskoja ja tai vastaavia, jotka muodostavat eräänlaisen
kaavarin. Tällaiset taipuisat elimet, kuten harjakset, liuskat tai vastaavat
ohjaavat irtonaisen hännän H pehmeästi rullan pintaan ja, hitaammasta
pintaanopeudesta johtuen irrottavat hännästä sen pään iskeytymisessä
mahdollisesti irtoavat osat. On myös mahdollista, että staattisessa oh-
jauselimessä on rullan kehää vasten tai sen läheisyydessä vain yksi
poikittainen liuska tietyllä leveydellä vasten rullan kehäpintaa ja/tai oh-
jaamassa häntää H.

Mikäli ohjauselin 3a on pyörivä, voidaan sen pinta myös muodostaa
harjaksista, jolloin se on eräänlainen rullan pintaa pyyhkivä harjatela, tai
konesuuntaan nähden poikittaisista liuskoista, jotka myös pyyhkivät
rullan pintaa, jolloin se on eräänlainen liuskapintainen tela.

Ohjauseli-
men 3a pintarakenne voi olla myös yhtenäinen kokoonpainu-
va rakenne, esim. se voi olla sienimäisen kappaleen pinta.

30

Kuvassa 3 on esitetty, kuinka ohjauseli-
men 3a pinta koskettaa rullan R
kehäpintaa. Kosketus on tällöin kevyt siten, että elimen 3a myöten an-
tava pinta on työnnetty lyhyen matkaa (etäisyys d) rullan kehäpintaa
vasten. Kuvan 3 mukaan harjan pinnan takaosa on tietyllä matkaa ke-
vyessä kuormituskontaktissa rullan kehäpinnan kanssa.

35

- Toinen vaihtoehto on kosketukseton ohjaus, jossa ohjauselimien 3a pinta ei ole kosketuksissa tiiviin rullan R uloimman pintakerroksen kanssa, vaan on pikemminkin kontaktissa rainan loppupäästä muodostuvan hännän H kanssa ja ohjaa näin häntää lähemmäksi rullaa. Etäisyys rullan uloimmasta pintakerroksesta on tässä tapauksessa pieni, edullisesti alle 10 mm. Pienellä etäisyydellä rullan kehäpinnasta oleva ohjauselin 3a kykenee myös estämään hännästä irtoavien palojen menemisen painotelan 3b ja rullan R välistä.
- 5
- 10 Ohjauselin 3a sijaitsee edullisimmin pyörimissuunnassa ennen painotela 3b, jolloin se ottaa ensiksi vastaan rullan kehän suunnassa tulevan irtonaisen hännän H. On kuitenkin mahdollista, että ohjauselin 3a on painotelan 3b jälkeen lyhyen matkan päässä siitä, jolloin se on riittävän lujassa kontaktissa rullan pintaan siten, että se kykenee pyyhkimään
- 15 rullan ja painotelan 3b välisen nipin läpi päässeet paperipalat pois rullan pinnasta. Ohjauselimien 3a pintarakenne ja liike (staattinen/pyörivä) voi olla järjestetty edellä kuvatun mukaisesti.
- Ohjauselin 3a voi olla myös suhteellisen jäykkä, rullan pyörimissuuntaa vastaan suunnattu elin, joka sijaitsee rullan kehän suunnassa ennen painotela 3b ja on sijoitettu pienen matkan (esim. alle 20 mm) päähän rullan kehäpinnasta irti siitä, jolloin sen tarkoituksena on ottaa vastaan ja katkaista elimen sijoitusetäisyyttä kauempana rullan pinnasta irti oleva hännän H pää ja ohjata sitä edeltävä häntä kohti painotelan 3b ja
- 20 rullan R välistä nippiä. Tällainen elin voi olla rainan pyörimissuuntaa vastaan suippeneva ja se voidaan muodostaa esim. teräväreunaiseksi katkaisuteräksi.
- 25
- Ohjauselin 3a ja painotela 3b järjestetään edullisesti yhteiseen, kone-suunnassa rullan R suhteen ja yhdessä rullan liikkeen mukana liikuteltavaan runkoon 3c jompaan kumpaan edellä kuvattuun järjestykseen. Tällöin on painotelan 3b ja ohjauselimien 3a välinen etäisyys järjestettävissä myös sopivan pieneksi niiden hyvää yhteistoimintaa ajatellen. Kuten kuvassa 3 on esitetty, painotela 3b voidaan laakeroida rungosta
- 30 3c ulkoneviin kannattimiin 3d ja ohjauselin 3a rungosta ulkonevaan varteeseen 3e. Sopiva kuormitus ja ohjauselimien 3a sijoittuminen rullan kehäpinnan suhteen voidaan saada aikaan ajamalla painolaite 3 rainan
- 35

8

- W tulosuunnasta rullan R alle riittävän pitkälle. Painotelan 3b kuormitus voi olla myös painolaitteeseen järjestetyillä toimilaitteilla säädettävä, ja ohjauselimen 3a asemaa voidaan myös säätää esim. sitä kannattavan varren 3e asentoa muuttamalla. Tämä säätö voidaan tehdä manuaalisesti ennen kuin painolaite ajetaan kiinni rullaan R, tai ohjauselimen 3a asema voi olla säädettävissä sopivilla toimilaitteilla kun painolaite 3 on toiminta-asennossa rullan yhteydessä.
- Ohjauselin 3a on edullisesti koko rainan leveydelle ulottuva. Ohjauselin voi ulottua myös vain osalle rainan leveyttä esim. kohdissa, joissa häntä H on pisin. Se voi tällöin olla vain tietynleveyisellä alueella molemmilla reunoilla tapauksissa, joissa erityisen pitkät osuudet jäävät rullaan juuri reunoille hanhenkaulavaihdoissa tai vastaavissa vaihtomenetelmissä, joissa raina repeää ensin keskeltä. Painotela 3b on edullisesti rullan R koko leveydelle ulottuva.

Patenttivaatimukset:

1. Menetelmä paperirainan rullaimen yhteydessä, jossa on pyörivä tampuuritela (2), jonka ympärille on muodostettu rulla (R) rullaimeen tulleesta paperirainasta (W), jolloin menetelmässä rullalle tuleva raina (W) katkaistaan, ja rullan pintakerrokset sidotaan pyörivän rullan (R) pintaan kontaktissa olevalla painolaitteella (3), joka käsittää rullan kehäpinnan kanssa nipin muodostavan, oleellisesti samalla pintaanopeudella pyörivän painoelimen (3b), **tunnettu** siitä, että painoelimen (3b) lisäksi rullan pyörimisliikkeen mukana liikkuvaa rainan vapaata loppupäätä eli häntää (H) ohjataan vasten rullan (R) kehäpintaa ohjauselimellä (3a), joka on rullan kehän suunnassa välimatkan päässä painoelimestä (3b) ja jonka rullaa vastapäätä olevalla pinnalla on pienempi nopeus rullan (R) kehäpinnan liikesuuntaan kuin rullan (R) kehäpinnalla.
2. Patenttivaatimuksen 1 mukainen menetelmä, **tunnettu** siitä, että ohjauselin (3a) on staattinen elin, jonka häntään (H) ja/tai rullan (R) kehäpintaan kontaktissa oleva pinta on paikallaan.
3. Patenttivaatimuksen 1 mukainen menetelmä, **tunnettu** siitä, että ohjauselin (3a) on pyörivä.
4. Jonkin edellisen patenttivaatimuksen mukainen menetelmä, **tunnettu** siitä, että häntään (H) ja/tai rullan (R) kehäpintaan kontaktissa oleva ohjauselimen (3a) pinta on joustava.
5. Patenttivaatimuksen 4 mukainen menetelmä, **tunnettu** siitä, että ohjauselimessä (3a) on yksi tai useampi taipuisa häntään (H) ja/tai rullan (R) kehäpintaan kontaktissa oleva elin.
6. Patenttivaatimuksen 5 mukainen menetelmä, **tunnettu** siitä, että ohjauselin (3a) käsittää harjaksia, jotka ovat kontaktissa häntään (H) ja/tai rullan (R) kehäpintaan.
7. Jonkin edellisen patenttivaatimuksen mukainen menetelmä, **tunnettu** siitä, että ohjauselimellä (3a) ohjataan häntää (H) vasten rullan ke-

hápintaa rullan pyörimissuunnassa ennen painoelintä (3b), edullisesti alle 30° kulmaetäisyydellä siitä.

5 8. Laite paperirainan rullaimeen yhteydessä, jossa on pyörivä tampuuri-
tela (2) ja sen ympärille rullaimeen tulleesta paperirainasta (W) muo-
dostettu rulla (R), jolloin laite on järjestettävissä kontaktiin pyörivän rul-
lan (R) pintaan ja käsittää rullan kehäpinnan kanssa nipin muodosta-
van, oleellisesti samalla pintaanopeudella pyörivän painoelimen (3b),
10 **tunnettu** siitä, että painoelimen (3b) lisäksi laitteeseen kuuluu paino-
elimestä (3b) erillinen ohjauselin (3a), joka on siirrettävissä toiminta-
asentoon rullan kehäpinnan läheisyyteen tai kontaktiin sen kanssa rul-
lan pyörimisliikkeen mukana liikkuvan rainan vapaan loppupään eli
hännän (H) ohjaamiseksi vasten rullan (R) kehápintaa, jolloin ohjauselin
15 (3a) on toiminta-asennossa rullan kehän suunnassa välimatkan päässä
painoelimestä (3b) ja sen rullaa vastapäätä olevan pinnan nopeus rul-
lan (R) kehäpinnan liikesuuntaan on järjestetty pienemmäksi kuin rullan
(R) kehäpinnan liikenopeus.

20 9. Patenttivaatimuksen 8 mukainen laite, **tunnettu** siitä, että ohjaus-
elin (3a) on staattinen elin, jonka häntään (H) ja/tai rullan (R) kehäpin-
taan kontaktissa oleva pinta on paikallaan.

10. Patenttivaatimuksen 8 mukainen laite, **tunnettu** siitä, että ohjaus-
elin (3a) on järjestetty toiminta-asennossa pyöriväksi.

25 11. Jonkin edellisen patenttivaatimuksen 8–10 mukainen laite, **tun-
nettu** siitä, että ohjauselimessä (3a) on joustava pinta, joka on järjestet-
tävissä kontaktiin hännän (H) ja/tai rullan (R) kehäpinnan kanssa.

30 12. Patenttivaatimuksen 11 mukainen laite, **tunnettu** siitä, että oh-
jauselimessä (3a) on yksi tai useampi taipuisa elin, joka on järjestettä-
vissä kontaktiin hännän (H) ja/tai rullan (R) kehäpinnan kanssa.

35 13. Patenttivaatimuksen 12 mukainen laite, **tunnettu** siitä, että oh-
jauselin (3a) käsittää harjaksia, jotka ovat järjestettävissä kontaktiin
hännän (H) ja/tai rullan (R) kehäpinnan kanssa.

14. Jonkin edellisen patenttivaatimuksen 8–13 mukainen laite, **tunnettu** siitä, että ohjauselin (3a) sijaitsee toiminta-asennossa kontaktissa häntään (H) ja/tai rullan (R) kehäpintaan rullan pyörimissuunnassa ennen painoelintä (3b), edullisesti alle 30° kulmaetäisyydellä painoelimestä (3b).

15. Jonkin edellisen patenttivaatimuksen 8–14 mukainen laite, **tunnettu** siitä, että ohjauselin (3a) ja painoelin (3b) on kiinnitetty yhteiseen runkoon (3c), joka on siirrettävissä toiminta-asentoon rullan (R) yhteyteen.

16. Patenttivaatimuksen 15 mukainen laite, **tunnettu** siitä, että ohjauselimen (3a) asema rungon (3c) suhteen on säädettävissä.

Tiivistelmä:

Menetelmässä paperirainan rullaimen yhteydessä on pyörivä tampuuritela (2), jonka ympärille on muodostettu rulla (R) rullaimeen tulleesta paperirainasta (W). Menetelmässä rullalle tuleva raina (W) katkaistaan, ja rullan pintakerrokset sidotaan pyörivän rullan (R) pintaan kontaktissa olevalla painolaitteella (3), joka käsittää rullan kehäpinnan kanssa nipin muodostavan, oleellisesti samalla pintaanopeudella pyörivän painoelimen (3b). Painoelimen (3b) lisäksi rullan pyörimisliikkeen mukana liikkuva rainan vapaata loppupäätä eli häntää (H) ohjataan vasten rullan (R) kehäpintaa ohjauselimellä (3a), joka on rullan kehän suunnassa välimatkan päässä painoelimestä (3b) ja jonka rullaa vastapäätä olevalla pinnalla on pienempi nopeus rullan (R) kehäpinnan liikesuuntaan kuin rullan (R) kehäpinnalla.

Fig. 3

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
4 January 2001 (04.01.2001)

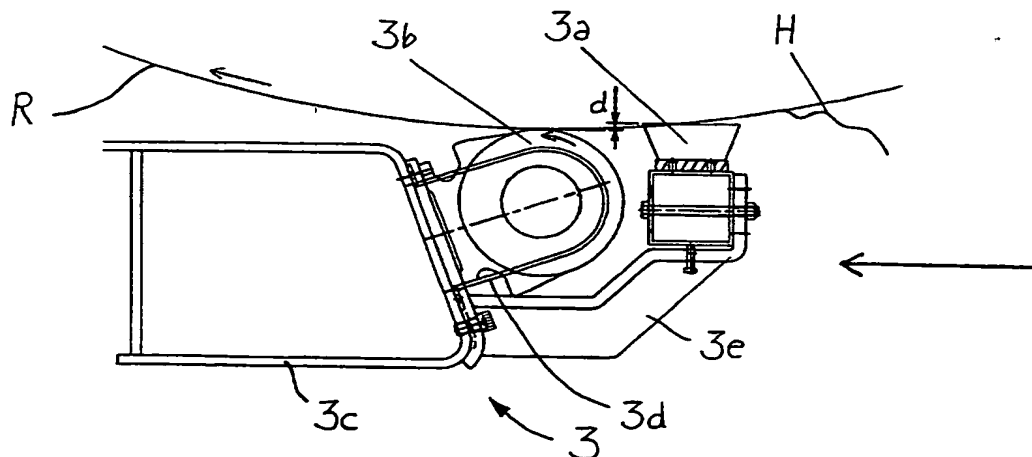
PCT

(10) International Publication Number
WO 01/00515 A1

- (51) International Patent Classification⁷: **B65H 18/26** (74) Agent: **TAMPEREEN PATENTTITOIMISTO OY;**
Hermiankatu 6, FIN-33720 Tampere (FI).
- (21) International Application Number: **PCT/FI00/00501**
- (22) International Filing Date: **6 June 2000 (06.06.2000)**
- (25) Filing Language: **Finnish**
- (26) Publication Language: **English**
- (30) Priority Data:
991450 24 June 1999 (24.06.1999) FI
- (71) Applicant (for all designated States except US): **VALMET CORPORATION [FI/FI];** Fabianinkatu 9 A, FIN-00130 Helsinki (FI).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **MÄKINEN, Risto [FI/FI];** Sointulantie 2, FIN-04600 Mäntsälä (FI). **EN-WALD, Petri [FI/FI];** Karkiantie 1 E, FIN-04310 Tuusula (FI). **VERÄJÄNKORVA, Janne [FI/FI];** Nuumäentie 7 A 3, FIN-02710 Espoo (FI).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU (utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, CZ (utility model), DE, DE (utility model), DK, DK (utility model), DM, DZ, EE, EE (utility model), ES, FI, FI (utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (utility model), SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- Published:
— With international search report.

[Continued on next page]

(54) Title: A METHOD AND A DEVICE IN CONNECTION WITH A REEL-UP



(57) Abstract: In the method in connection with a reel-up of a paper web there is a rotating reel spool (2) around which a reel (R) has been formed from the paper web (W) passed to the reel-up. In the method web (W) passed to the reel is cut, and the surface layers of the reel are bound by means of a press device (3) which is in contact with the surface of the rotating reel (R) and comprises a press member (3b) forming a nip with the peripheral surface of the reel and rotating substantially at the same surface speed therewith. In addition to using the press member (3b), the final end, i.e. tail (H) of the web that travels along with the rotating motion of the reel is guided against the peripheral surface of the reel (R) by means of a guiding member (3a), which is located within a distance from the press member (3b) in the direction of the perimeter of the reel and whose surface that is located opposite to the reel has a lower speed in the direction of motion of the peripheral surface of the reel than the peripheral surface of the reel (R).



WO 01/00515 A1



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

A method and a device in connection with a reel-up

The invention relates to a method according to the preamble of the appended claim 1 in connection with a reel-up. The invention also
5 relates to a device in connection with the reel-up, the device being of the type presented in the preamble of the appended claim 8.

By means of a continuous reel-up a continuous paper web, typically of several meters wide, passed from a paper machine or finishing
10 machine for paper, is reeled to form machine reels. To implement the reeling in a continuous manner, a reel change has to be conducted at fixed intervals, so that when the preceding machine reel becomes full, the web is guided to travel to a new reel spool forming the core of the next machine reel.

15 In the reeling station, when the reel to be reeled becomes full, the web is cut by means of a suitable method which depends e.g. on the grammage of the web, and the new end of the web following the cutting point is guided around a new empty reel spool which has been brought
20 to a change position from a reel spool storage at an earlier stage. There are a number of patents and patent applications related to this change sequence or a part of the same. The Finnish patent 95683 of the applicant, the corresponding international publication WO 93/34495 and US patent 5,779,183 disclose a press device by means of which
25 the access of air underneath the web entering the reel is prevented. The Finnish patent application 915432 of the applicant, as well as the corresponding US patent 5,360,179, in turn, disclose different ways of cutting the web in connection with the reel change. The Finnish patent 97339 of the applicant and the corresponding EP application
30 publication 739695 and the US patent 5,765,462 disclose a blade cutting device that cuts the web. Furthermore, the Finnish patent 100590 of the applicant discloses a manner in which the web can be cut in full-width by means of a striking cutting blade, and the new end of the web can be blown on a new empty reel spool by means of an air
35 blowing.

It is known to move the aforementioned press device in which a brush or a roll functions as a contact member, to a loading contact with a surface of the reel, substantially the lower surface of the reel, in the end phase of the reeling process, and the press device is conveyed in loading contact with the full reel when the reel is transferred to a change position. By means of press devices of prior art it has been possible to prevent the access of air in the reel, and thereby the slackening of the surface layers of the machine reels.

However, especially when the running speeds exceed 25 m/s, problems are caused by the behaviour of the "tail" remaining topmost in the machine reel after the cutting.

When a brush-like member is used as a contact member in the press device, the bristles of which are in contact with the surface of the machine reel, problems are caused by the insufficient linear load in the contact point. The contact of the brush and the paper produces dust. Furthermore, the dragging force caused by the brush causes a change in the web tension in connection with the reel change.

The press roll used as a contact member keeps the reel well in its form, and it does not produce dust. When the tail meets the press device it is not in contact with the surface of the reel, and it hits the press device thus causing a strong pull in the paper, wherein pieces of paper are torn off. The press roll presses these loose pieces on the surface of the paper reel, and these pieces travel along with the rotating motion of the reel to the upper sector of the reel, wherefrom they may drift in the nip between the new, initiated reel and the reeling cylinder, thereby ending up inside the new reel and causing broke and problems at the next stage of the process, especially in a supercalender or a corresponding multinip calender.

One purpose of the present invention is to introduce a method in connection with the reel change, by means of which the above-presented drawbacks of the solutions of prior art can be eliminated to a large degree, thus improving the state of the art in the field. To attain this purpose, the method according to the invention is primarily

3

characterized in what will be presented in the characterizing part of the appended claim 1. The device according to the invention, in turn, is characterized in what will be presented in the characterizing part of the appended claim 8.

5

The method is characterized in that the reel and/or the tail which is not in contact with the reel or tends to loosen from the same are/is controlled at two distinct points on the perimeter of the reel: control of the outer surface layers of the reel by means of a press roll producing the loading and control of the tail by means of a separate guiding member which applies a smaller load to the reel and whose surface speed differs substantially from the surface speed of the peripheral surface of the reel. The latter member is primarily used for controlling the tail by guiding it towards the reel and/or by wiping off the pieces detached from the tail before they are conveyed to the upper half of the reel wherefrom they could again end up in the closing reeling nip. The device is characterized by the combination of the press roll of the reel and the guiding member of the tail.

20 The other characteristics of the invention are disclosed in the appended dependent claims and in the description hereinbelow.

In the following, the invention will be described in more detail with reference to the appended drawing, in which

25

Fig. 1 shows a side-view of a situation in the reel-up of a paper web before the cutting of the web,

30

Fig. 2 shows a side-view of a situation in the reel-up of a paper web after the cutting of the web, and

Fig. 3 illustrates the device on larger scale.

35

Fig. 1 shows a reel-up for paper web known as such, in which reel-up the method and the device are applied. Said reel-up is a continuous reel-up which reels successive machine reels R around reel spools 2 from a continuous paper web W passed from a paper machine or

finishing machine for paper. During the reeling, the reel spools 2 are supported at the ends by means of a suitable supporting structure, such as reeling rails. During the reeling, the machine reels are rotated with a centre-drive of their own. Fig. 1 shows a situation in which, to implement the reel change, the machine reel R that has become full is taken away from the reeling cylinder 1 by means of reeling carriages which are in contact with the ends of the reel spool 2, via which reeling cylinder the paper web W has been passed to the reel through a reeling nip between the reel and the cylinder 1. The narrowing gap between the incoming run of the web and the outer surface of the reel, via which gap air tends to intrude into the reel, is marked with an arrow G. Furthermore, Fig. 1 shows how the new reel spool 2 is brought in contact with the web W travelling on the surface of the reeling cylinder 1 to conduct the change.

Fig. 1 also shows a press device 3, which in the situation of Fig. 1 is used for preventing the access of air via the gap G underneath the web in the reel. In a situation where the reel R is becoming full, but is still in contact with the reeling cylinder via the reeling nip, the press device 3 has been brought in loading contact with the surface of the reel R, and it is transferred forward together with the reel to the change position of Fig. 1, out of contact with the reeling cylinder 1a. Solutions for transferring the press device 3 in contact with the reel and forward together with the reel, are not described in more detail. Thereafter the web is cut at the point marked with arrow C for example with a full-width blade cutting device or by means of change blowing, whereafter the new end of the web is guided around a new reel spool 2.

Fig. 2 shows a situation after the cutting. The free final end of the web that constitutes the last section of the web passed to the reel forms a tail H, which tends to get loose from the reel R. After the cutting the deceleration of the speed of rotation of the reel R also begins, for example by means of the centre-drive of the reel spool forming the core of the reel. In the direction of rotation of the reel R the press device 3 comprises first a guiding member 3a, the purpose of which is primarily to guide the tail of the cut web W closer to the peripheral surface of the reel or against the peripheral surface of the reel, and a

member which is loaded against the surface of the reel with a particular force and which rotates at the same surface speed as the reel, forming a nip with the peripheral surface of the reel. Such a member can be composed of a press roll 3b journaled for free rotation. The guiding member 3a is not necessarily in contact with the surface layers of the reel, and if it is in contact with them, it lies, in any case, against the peripheral surface of the reel with a lower force than the press roll 3b following the guiding member 3a and preventing the access of air from the gap G to the reel in the situation of Fig. 1, and binding the surface layers of the reel in the situation of Fig. 2 to keep them together especially when the speed of rotation of the reel is reduced.

The guiding member 3a is located within the area of the lower half of the reel and it is used for guiding the travel of the tail H forming the final section of the cut web W. The guiding member 3a is preferably located in the vicinity of the lowest point of the reel, for example in the sector of $\pm 45^\circ$ therefrom. The press roll 3b is located within a short distance after the guiding member 3a. The distance is such that it is not possible for the tail to substantially loosen itself from the surface of the reel. The distance, when measured along the perimeter of the reel is advantageously approximately smaller than $\frac{1}{4}$ of the diameter of the reel, in other words in degrees approximately under 30° .

The free tail H revolves during several laps around the rotation axis of the reel on the perimeter of the reel R along with the rotating motion of the reel during several revolutions, and the guiding member 3a is used for controlling the behaviour of the tail H advantageously during several revolutions after the cutting of the web.

Fig. 3 shows the press device 3 in a more detailed manner. The guiding member 3a is attached to the same frame 3c as the press roll 3b which is arranged rotatable. The frame can be transferred e.g. along guides in the machine direction. As can be seen in the drawing, the control member is a brush formed of bristles, which is in contact with the peripheral surface of the reel R, thus wiping the surface of the reel when the reel is rotating. The press roll 3b is utilized for attaining the loading necessary for binding the surface layers together. If there were

no guiding member 3a before the press roll 3b, the tail H of the paper web would make a movement resembling a whiplash onto the surface of the roll 3b, and it would be broken into pieces, which the roll then would press against the surface of the reel. Now, in the situation shown in Fig. 3, the guiding member 3a prevents the pieces of paper possibly loosening from the web from being conveyed between the roll and the reel. The pieces possibly loosening from the tail remain in the guiding member 3a and drop down therefrom, wherein they can be easily guided for example to a pulper, which is below the reel-up.

The parallel surface speed of the surface of the guiding member 3a opposite to the reel and of the peripheral surface of the reel differ substantially from each other. Thus, there is a relative speed difference between the peripheral surface of the web and the surface of the guiding member opposite to the same. The speed difference is such that the speed of the surface of the guiding member 3a in the direction of the peripheral surface of the reel is clearly lower than the surface speed of the reel. The speed difference can be attained by arranging the guiding member 3a static, i.e. stationary, as the brush shown in Fig. 3, wherein the speed of the surface of the guiding member 3a with respect to the peripheral speed of the reel in the direction of travel of the peripheral surface of the reel is $-v_1$, where v_1 is the surface speed of the peripheral surface of the reel. Another possibility to attain the speed difference is to arrange the guiding member 3a rotatable in such a manner that it has the same direction of rotation as the reel R, wherein the surface of the guiding member 3a that is closest to the peripheral surface of the reel moves in a direction opposite to that of the peripheral surface of the reel R. If the surface speed of the guiding member is v_2 , the relative surface speed of the guiding member 3a with respect to the peripheral surface of the reel R is $-(v_1 + v_2)$. If the surface of the guiding member 3a is arranged to move in the same direction in which the peripheral surface of the reel moves at a lower surface speed v_2 than the peripheral surface of the reel in the point closest to the reel, the relative surface speed of the guiding member 3a with respect to the peripheral surface of the reel R is thus $-v_1 + v_2$. All the aforementioned cases cause the "dragging" of the surface of the

guiding member 3a against the peripheral surface of the reel R and/or against the tail H of the web.

5 The surface of the guiding member 3a opposite to the peripheral surface of the reel R is arranged elastic in such a manner that it can be pressed against the surface of the reel within a particular distance, and it can also conform to the variations in the diameter of the reel. Thus, the position of the guiding member 3a with respect to the reel R does not have to be adjusted accurately. To implement the yielding surface, 10 the guiding member 3a may be provided with bristles, but also with other types of flexible members, which wipe the surface layers of the reel R and/or the tail H. The guiding member 3a may be provided with flexible strips or the like, extending in the transverse direction of the machine, i.e. in the direction of the reel axis, forming a sort of a doctor blade. Such flexible members, e.g. bristles, strips or the like guide the 15 loose tail H softly on the surface of the reel, and because of the slower surface speed, release the pieces possibly loosening from the tail in the impact of its end. It is also possible that the static guiding member only has one transverse strip against the perimeter of the reel or in the vicinity of the same, within a particular width lying against the 20 peripheral surface of the reel and/or guiding the tail H.

If the guiding member 3a is a rotating guiding member, its surface can also be formed of bristles, wherein it is a kind of a brush roll wiping the 25 surface of the reel, or of strips transverse to the machine direction, the strips also wiping the surface of the reel, wherein it is a kind of a strip-faced roll.

30 The surface structure of the guiding member 3a can also be a uniform compressible structure, and it can, for example, be the surface of a sponge-like body.

35 Fig. 3 shows how the surface of the guiding member 3a touches the peripheral surface of the reel R. The touch is then a light touch in such a manner that the yielding surface of the member 3a has been pushed a short distance (distance d) against the peripheral surface of the reel. According to Fig. 3, the rear part of the surface of the brush is within a

particular distance in a light contact with the peripheral surface of the reel.

Another alternative is a contactless guidance, in which the surface of the guiding member 3a is not in contact with the outer surface layer of the compact reel R, but rather in contact with the tail H formed of the final end of the web, thus guiding the tail closer to the web. The distance from the outermost surface layer of the reel is in this case small, advantageously under 10 mm. The guiding member 3a within a small distance from the peripheral surface of the web is also capable of preventing the entrance of the small pieces loosened from the tail between the press roll 3b and the reel R.

The guiding member 3a is most advantageously located before the press roll 3b in the direction of rotation, wherein it first receives the loose tail H coming in the direction of the perimeter of the reel. It is, however, possible that the guiding member 3a is within a short distance from the press roll 3b after the same, wherein it is in a sufficiently tight contact with the surface of the web in such a manner that it is capable of wiping off the pieces of paper passed through the nip between the reel and the press roll 3b from the surface of the reel. The surface structure and the motion (static/rotating) of the guiding member 3a can be arranged according to the description above.

The guiding member 3a can also be a relatively rigid member which is directed against the direction of rotation of the reel and located before the press roll 3b in the direction of the perimeter of the reel, and it is spaced within a short distance (e.g. under 20 mm) from the peripheral surface of the reel, wherein the purpose of the same is to receive and cut the loose end of the tail H which is farther away from the reel than the positioning distance of the member, and to guide the tail preceding the loose end towards the nip between the press roll 3b and the reel R. Such a member can taper off against the direction of rotation of the web, and it can be formed as a sharp-edged cutting blade.

The guiding member 3a and the press roll 3b are advantageously arranged to a common frame 3c to be moved in the machine direction

with respect to the reel R and together with the motion of the reel, in either one of the above-described orders. Thus, the distance between the press roll 3b and the guiding member 3a can also be arranged to be suitably small in view of their good co-operation. As can be seen in Fig. 3, the press roll 3b can be journalled rotatably on brackets 3d protruding from the frame, and the guiding member can be mounted to an arm 3e protruding from the frame. A suitable loading and location of the guiding member 3a with respect to the peripheral surface of the reel can be attained by running the press device 3 sufficiently far underneath the reel R from the incoming direction of the web W. The loading of the press roll 3b can also be adjustable by means of actuators arranged in the press device, and the position of the guiding member 3a can also be adjusted e.g. by changing the position of the arm 3e supporting the same. This adjustment can also be made manually before the press device is run in contact with the reel R, or the position of the guiding member 3a can be adjustable by means of suitable actuators when the press device 3 is in its operating position in connection with the reel.

The guiding member 3a advantageously extends over the entire width of the web. The control member can also extend only over a part of the width of the web for example at points where the tail H is at its longest. Thus, it can be only within an area of particular width on both edges in cases where sections which are especially long remain in the reel on said edges in gooseneck changes or corresponding change methods, in which the web is first torn from the middle. The press roll 3b advantageously extends over the entire width of the reel R.

Claims:

1. Method in connection with a reel-up of a paper web provided with a rotating reel spool (2) around which a reel (R) has been formed from the paper web (W) passed to the reel-up, wherein in the method the web (W) passed to the reel is cut, and the surface layers of the reel are bound by means of a press device (3) which is in contact with the surface of the rotating reel (R) and comprises a press member (3b) forming a nip with the peripheral surface of the reel and rotating substantially at the same surface speed therewith, **characterized** in that in addition to using the press member (3b), the final end, i.e. tail (H) of the web that travels along with the rotating motion of the reel, is guided against the peripheral surface of the reel (R) by means of a guiding member (3a), which is located within a distance from the press member (3b) in the direction of the perimeter of the reel and whose surface that is located opposite to the reel has a lower speed in the direction of motion of the peripheral surface of the reel (R) than the peripheral surface of the reel (R).
2. The method according to claim 1, **characterized** in that the guiding member (3a) is a static member whose surface that is in contact with the tail (H) and/or the peripheral surface of the reel (R) is stationary.
3. The method according to claim 1, **characterized** in that the guiding member (3a) is a rotating guiding member.
4. The method according to any of the foregoing claims, **characterized** in that the surface of the guiding member (3a) that is in contact with the tail (H) and/or the peripheral surface of the reel (R) is elastic.
5. The method according to claim 4, **characterized** in that the guiding member (3a) comprises one or more flexible members in contact with the tail (H) and/or the peripheral surface of the reel (R).

6. The method according to claim 5, **characterized** in that the guiding member (3a) comprises bristles, which are in contact with the tail (H) and/or the peripheral surface of the reel (R).

5 7. The method according to any of the foregoing claims, **characterized** in that the guiding member (3a) is used for guiding the tail (H) against the peripheral surface of the reel before the press device (3b) in the direction of rotation of the reel, preferably under the angular distance of 30° from the same.

10 8. A device in connection with a reel-up of a paper web, comprising a rotating reel spool (2) and around the same a reel (R) formed from the paper web (W) passed to the reel-up, wherein the device can be arranged in contact with the surface of the rotating reel (R) and it
15 comprises a press member (3b) forming a nip with the peripheral surface of the reel and rotating substantially at the same surface speed therewith, **characterized** in that in addition to the press member (3b), the device comprises a guiding member (3a), separate from the press member (3b), which can be transferred in the operating position in the
20 vicinity of the peripheral surface of the reel or in contact with the same to guide the final free end of the web, i.e. a tail (H) moving along with the rotating motion of the reel, against the peripheral surface of the reel (R), wherein the guiding member (3a) is in the operating position within a distance from the press member (3b) in the direction of the perimeter
25 of the reel and its surface that is located opposite to the reel is arranged to have a lower speed in the direction of motion of the peripheral surface of the reel (R) than the peripheral surface of the reel (R).

30 9. The device according to claim 8, **characterized** in that the guiding member (3a) is a static member whose surface that is in contact with the tail (H) and/or the peripheral surface of the reel (R) is stationary.

35 10. The device according to claim 8, **characterized** in that the guiding member (3a) is arranged rotatable in its operating position.

12

11. The device according to any of the foregoing claims 8 to 10, **characterized** in that the guiding member (3a) has an elastic surface which can be arranged in contact with the tail (H) and/or the peripheral surface of the reel (R).

5

12. The device according to claim 11, **characterized** in that the guiding member (3a) comprises one or more flexible members, which can be arranged in contact with the tail (H) and/or the peripheral surface of the reel (R).

10

13. The device according to claim 12, **characterized** in that the guiding member (3a) comprises bristles, which can be arranged in contact with the tail (H) and/or the peripheral surface of the reel (R).

15

14. The device according to any of the foregoing claims 8 to 13, **characterized** in that in its operating position the guiding member (3a) is in contact with the tail (H) and/or with the peripheral surface of the reel (R) before the press device (3b) in the direction of rotation of the reel, advantageously under the angular distance of 30° from the same.

20

15. The device according to any of the foregoing claims 8 to 14, **characterized** in that the guiding member (3a) and the press member (3b) are fixed to a common frame (3c) which can be transferred to the operating position in connection with the reel (R).

25

16. The device according to claim 15, **characterized** in that the position of the guiding member (3a) with respect to the frame (3c) is adjustable.

1/2

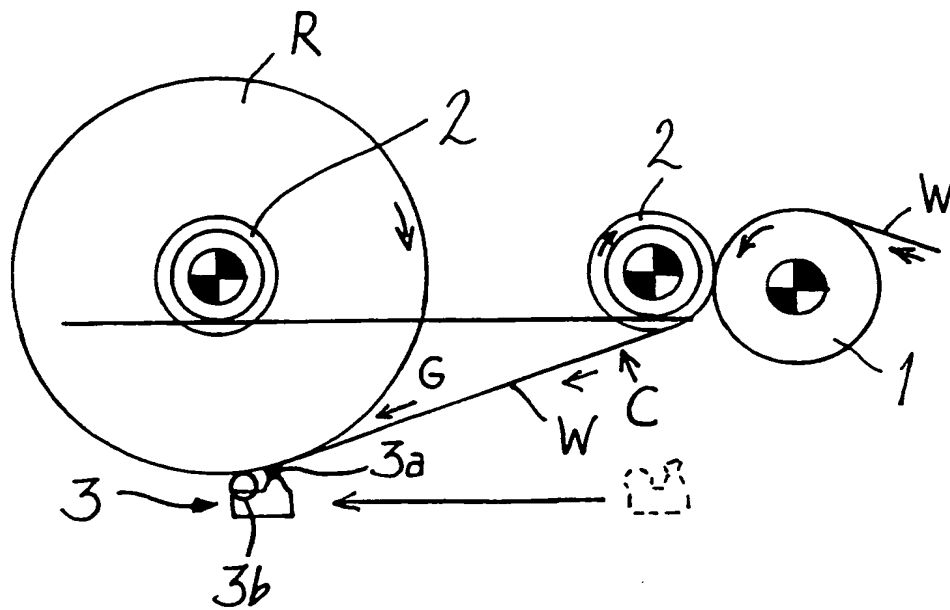


Fig. 1

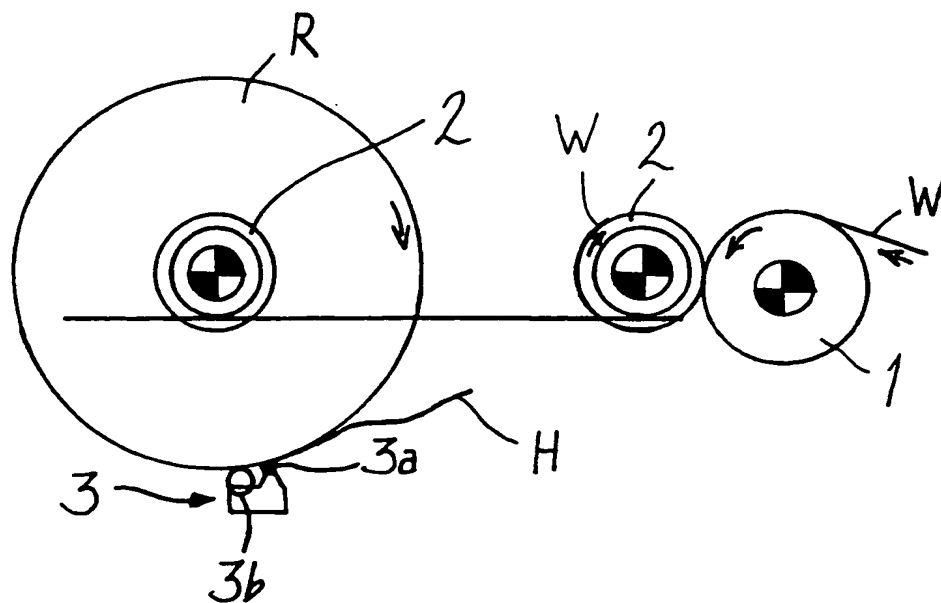


Fig. 2

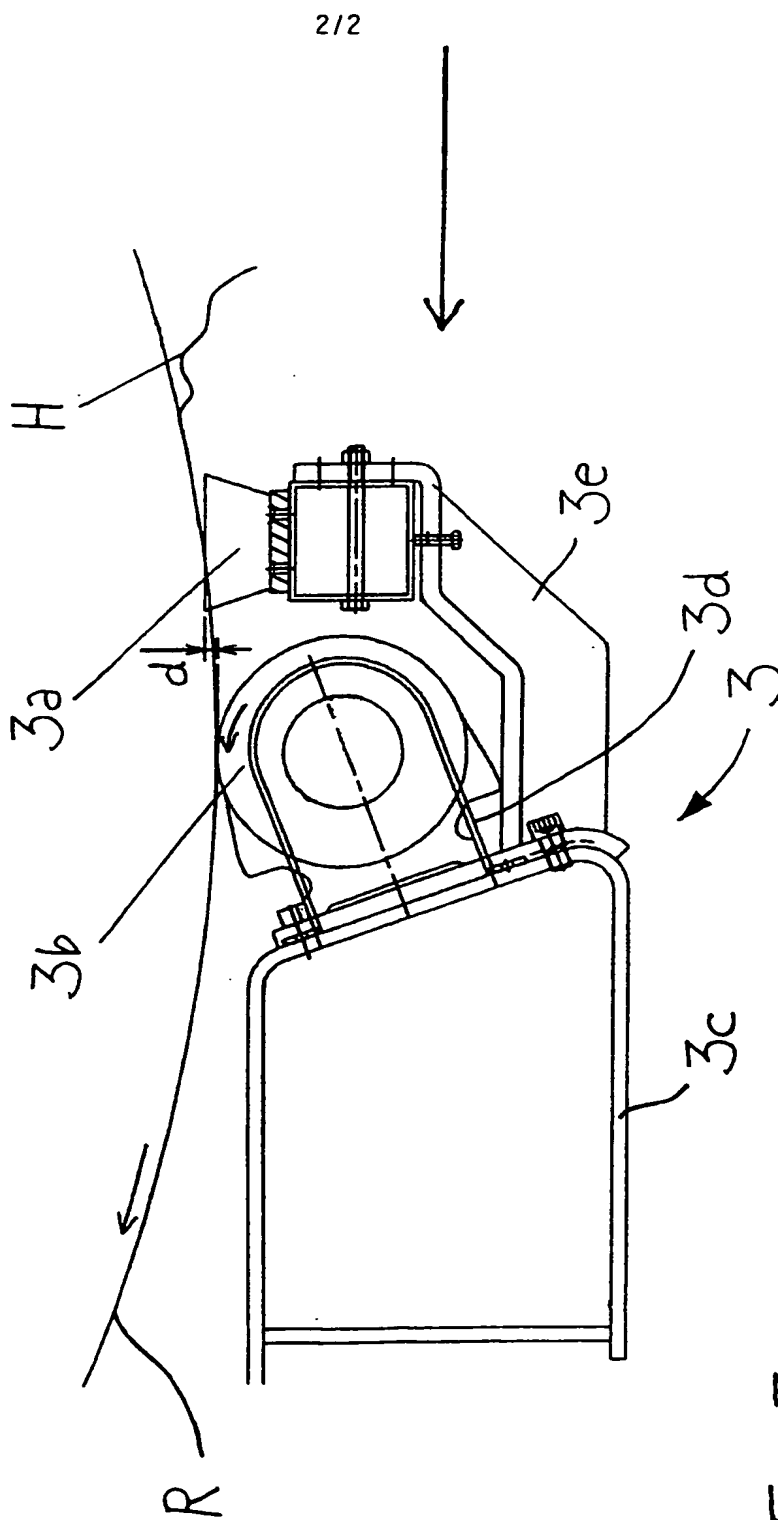


Fig. 3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 00/00501

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B65H 18/26

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B65H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4778119 A (T. YAMAZAKI ET AL), 18 October 1988 (18.10.88), column 3, line 5 - line 16; column 4, line 9 - column 5, line 5, figure 1 --	1,3-5,7,8, 10-12,14-15
A	US 5779183 A (E. AALTO ET AL), 14 July 1998 (14.07.98), figures 1-4, abstract --	1,8
A	US 5895007 A (R. MOLLER ET AL), 20 April 1999 (20.04.99), column 6, line 44 - column 7, line 21, figures 7-11 -- -----	1,8

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

11 October 2000

Date of mailing of the international search report

9 8 -10- 2000

Name and mailing address of the ISA /

Swedish Patent Office

Box 5055, S-102 42 STOCKHOLM

Facsimile No. +46 8 666 02 86

Authorized officer

Anders Brinkman / MRo

Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT
Information on patent family members

03/10/00

International application No.
PCT/FI 00/00501

Patent document cited in search report			Publication date	Patent family member(s)		Publication date
US	4778119	A	18/10/88	DE	3625221 A,C	12/02/87
				JP	62031645 A	10/02/87
<hr/>						
US	5779183	A	14/07/98	AT	177707 T	15/04/99
				CA	2169011 A	21/12/95
				DE	69508350 D,T	28/10/99
				EP	0714373 A,B	05/06/96
				SE	0714373 T3	
				FI	95683 B,C	30/11/95
				FI	942743 D	00/00/00
				JP	9501387 T	10/02/97
				WO	9534495 A	21/12/95
<hr/>						
US	5895007	A	20/04/99	BR	9706158 A	06/04/99
				CA	2214297 A	28/02/98
				CN	1175541 A	11/03/98
				DE	19635216 A	05/03/98
				EP	0826615 A	04/03/98
				JP	10087127 A	07/04/98
<hr/>						

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PPC11155/UH	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/FI00/00501	International filing date (day/month/year) 06/06/2000	Priority date (day/month/year) 24/06/1999
International Patent Classification (IPC) or national classification and IPC B65H18/26		
Applicant		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 5 sheets, including this cover sheet.

- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 16/01/2001	Date of completion of this report 25.07.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Poalas, K Telephone No. +49 89 2399 2066 

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/FI00/00501

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-9 as originally filed

Claims, No.:

1-16 as originally filed

Drawings, sheets:

1/2-2/2 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/FI00/00501

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-16
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-16
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-16
	No:	Claims	

2. Citations and explanations see separate sheet

Ad section V

Claim 1

US 5 779 183 A discloses a method according to the preamble of claim 1.

It is the object of the present application to avoid the application of a strong pull at the tail portion of a paper web.

This object is achieved through a method according to claim 1, wherein in addition to using the press member, the final end, i. e. tail of the web that travels along with the rotating motion of the reel, is guided against the peripheral surface of the reel by means of a guiding member, which is located within a distance from the press member in the direction of the perimeter of the reel and whose surface that is located opposite to the reel has a lower speed in the direction of motion of the peripheral surface of the reel than the peripheral surface of the reel.

None of the documents of the international search report discloses a method according to claim 1. Also a combination of the teachings of said documents does not render obvious such a method. US 4 778 119 A describes the winding-up of a magnetic tape, wherein an edge control roller and a push roller, both having a peripheral speed equal to the peripheral speed of the reel, are used.

Claim 1 therefore fulfils the requirements of Articles 33(2) and 33(3) PCT.

Claims 2 to 7

Claims 2 to 7, disclosing modifications of the inventive idea embodied in claim 1, also meet the requirements of Articles 33(2) and 33(3) PCT.

Claim 8

US 5 779 183 A discloses a device according to the preamble of claim 8.

It is the object of the present application to avoid the application of a strong pull at the tail portion of a paper web.

This object is achieved through a device according to claim 8, wherein in addition to the press member, the device comprises a guiding member, separate from the press member, which can be transferred in the operating position in the vicinity of the peripheral surface of the reel or in contact with the same to guide the final free end of the web, i. e. a tail moving along with the rotating motion of the reel, against the peripheral surface of the reel, wherein the guiding member is in the operating position within a distance from the press member in the direction of the perimeter of the reel and its surface that is located opposite to the reel is arranged to have a lower speed in the direction of motion of the peripheral surface of the reel than the peripheral surface of the reel.

None of the documents of the international search report discloses a device according to claim 8. Also a combination of the teachings of said documents does not render obvious such a device. US 4 778 119 A describes the winding-up of a magnetic tape, wherein an edge control roller and a push roller, both having a peripheral speed equal to the peripheral speed of the reel, are used.

Claim 8 therefore fulfils the requirements of Articles 33(2) and 33(3) PCT.

Claims 9 to 16

Claims 9 to 16, disclosing modifications of the inventive idea embodied in claim 8, also meet the requirements of Articles 33(2) and 33(3) PCT.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 00/00501

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B65H 18/26

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B65H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4778119 A (T. YAMAZAKI ET AL), 18 October 1988 (18.10.88), column 3, line 5 - line 16; column 4, line 9 - column 5, line 5, figure 1 --	1,3-5,7,8, 10-12,14-15
A	US 5779183 A (E. AALTO ET AL), 14 July 1998 (14.07.98), figures 1-4, abstract --	1,8
A	US 5895007 A (R. MOLLER ET AL), 20 April 1999 (20.04.99), column 6, line 44 - column 7, line 21, figures 7-11 -- -----	1,8

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

- * Special categories of cited documents
- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed
- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search

11 October 2000

Date of mailing of the international search report

18-10-2000

Name and mailing address of the ISA/
Swedish Patent Office
Box 5055, S-102 42 STOCKHOLM
Facsimile No. +46 8 666 02 86

Authorized officer

Anders Brinkman / MRO
Telephone No. +46 8 782 25 00

International application No.
PCT/FI 00/00501

Form PCT/ISA:210 (patent family annex) (July 1992)